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57. (Amended) The headlamp control system of claim 54, wherein said control is operable to identify at least one object of interest in the field of view by pattern recognition of two or more objects.

68. (Amended) The headlamp control system of claim 66, wherein said control is operable to determine an activity condition in response to a threshold level of said level of objects of interest.

70. (Amended) The headlamp control system of claim 69, wherein said control is operable to adjust a headlamp of the motor vehicle between the low beam state and a high beam state in response to at least one of the activity condition and the low beam duration of time.

72. (Amended) A headlamp control system for a motor vehicle comprising:

an imaging array sensor operable to sense light in a field of view forward of the motor vehicle, said imaging array sensor being operable to sense light for a first exposure period and a second exposure period, said first exposure period being greater than said second exposure period, said imaging array sensor being operable to sense light in at least one of said first and second exposure periods in response to a detection of light in the field of view forward of the motor vehicle which is indicative of at least one of (a) a headlamp of at least one other vehicle approaching the motor vehicle and (b) a taillight of at least one other vehicle being approached by the motor vehicle; and

a control that is responsive to said imaging array sensor, said control identifying at least one of a headlamp of at least one other vehicle approaching the motor vehicle and a taillight of at least one other vehicle being approached by the motor vehicle in response to light sensed during at least one of said first and second exposure periods.

REMARKS

The amendments and remarks presented herein are believed to be fully responsive to the Office Action dated April 24, 2002.

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Claims 54-86 are pending in the application. Claims 54, 57, 68, 70 and 72 have been amended as set forth above. The amendments are fully supported in the specification and drawings as originally filed. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

CLAIM OBJECTION

Claim 72 was objected to because the term "actuatable" was not recognized as a word by the Examiner. Applicants have amended claim 72 to clarify that the imaging array sensor is "operable" to sense light for a first exposure period and a second exposure period, in order to overcome this objection.

DOUBLE PATENTING REJECTION

Claims 54, 55, 60, 61, 65-68 and 72-83 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 5 and 13-18 of U.S. Patent No. 5,796,094. Claims 56-59, 62-64 and 69-71 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 5 and 13-18 of U.S. Patent No. 5,796,094, in view of U.S. Patent No. 5,426,294. Claim 84 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 5 and 13-18 of U.S. Patent No. 5,796,094, in view of U.S. Patent No. 5,461,357. Claim 85 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 5 and 13-18 of U.S. Patent No. 5,796,094, in view of U.S. Patent No. 5,351,044. Claim 86 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 5 and 13-18 of U.S. Patent No. 5,796,094, in view of U.S. Patent No. 5,650,944.

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Without acquiescing in the rejection of these claims under the judicially created doctrine of obviousness-type double patenting, Applicants enclose herewith a Terminal Disclaimer and associated fee with respect to U.S. Patent No. 5,796,094. The basis for the double-patenting rejection is obviated. Accordingly, withdrawal of the rejection is respectfully requested.

Please charge Account No. 22-0190 for the \$110.00 fee and any additional fees which may be due. A duplicate copy of this sheet is attached.

Claims 54-86 were also provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 54-86 of copending application, Serial No. 09/988,235. Applicants have expressly abandoned application, Serial No. 09/988,235, such that this provisional rejection is overcome or will be overcome as soon as the petition is acted on by the petitions office.

CLAIM REJECTIONS

Rejection under 35 U.S.C. §112

Claims 68-70 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite due to the term "high" in claim 68.

Applicants have amended claim 68 to clarify that the control is operable to determine an activity condition in response to a threshold level of the level of objects of interest. Claim 70 has been amended to correspond with the language of claim 68. Reconsideration and withdrawal of the rejection of claims 68-70 is respectfully requested.

Rejections under 35 U.S.C. §102(b) and 35 U.S.C. §103(a)

Claims 54, 55, 57, 60, 61, 64-66, 68 and 71 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kobayashi et al., U.S. Patent No. 5,426,294. Claims 67, 69

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and 70 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi et al. Claims 56, 58, 59 and 62 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kobayashi et al., in view of Yoshioka et al., U.S. Patent No. 5,461,357. Claim 63 was rejected under 35 U.S.C. §103(a) as being unpatentable over Kobayashi et al., in view of Mathur et al., U.S. Patent No. 5,351,044. Claims 72-83 and 86 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kobayashi et al., in view of Kise, U.S. Patent No. 5,650,944. Claim 84 was rejected under 35 U.S.C. §103(a) as being unpatentable over Kobayashi et al., in view of Kise and further in view of Yoshioka et al. Claim 85 was rejected under 35 U.S.C. §103(a) as being unpatentable over Kobayashi et al., in view of Kise and further in view of Mathur et al.

Applicants respectfully submit that none of the prior art cited, either alone or in combination with any other cited reference or references, discloses, teaches, suggests or renders obvious the headlamp control system of the present invention, particularly as set forth in independent claims 54 and 72, as amended above, and the claims depending therefrom.

Applicants have amended independent claim 54 to clarify that the control is operable to identify at least one object of interest in the field of view by a geometric organization of the at least one object. Applicants respectfully submit that Kobayashi et al., either alone or in combination with any other prior art of record, does not disclose, teach or suggest the headlamp control system of the present invention, particularly as set forth in independent claim 54, as amended above, and in the claims depending therefrom.

Kobayashi et al. discloses a glare sensor which detects light coming from the fore scene as light from a head lamp, light from a tail lamp or light from a street lamp along the side of the road. There is no teaching or suggestion of identifying a headlamp, taillight, traffic sign, a lane marker and/or a traffic light by a geometric organization. Reconsideration and withdrawal of the rejection of claims 54-71 is respectfully requested.

With respect to the rejection of dependent claims 56, 58, 59 and 62 over Kobayashi et al. in view of Yoshioka et al., Applicants submit that Yoshioka et al. discloses

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an obstacle detection device which determines if a detected object is within a path of the vehicle. Applicants respectfully submit that Kobayashi et al. and Yoshioka et al., either alone or in combination with one another or with any other prior art of record, do not disclose, teach, suggest or render obvious a control which is operable to identify a traffic sign by its geometric organization. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 56, 58, 59 and 62.

Applicants have also amended independent claim 72 to clarify that the imaging array sensor is operable to sense light in at least one of the first and second exposure periods in response to a detection of light in the field of view forward of the motor vehicle which is indicative of a headlamp and/or a taillight of another vehicle. Applicants respectfully submit that Kobayashi et al. and Kise, either alone or in combination with one another or with any of the other prior art of record, do not disclose, teach, suggest or render obvious the headlamp control system of the present invention, particularly as set forth in independent claim 72, as amended above, and the claims depending therefrom.

Kise discloses a shutter speed control method and system which is operable to change the shutter speed of the camera to adapt to changes of the ambient illumination outside of the vehicle. Kise does not disclose, suggest nor render obvious sensing light in at least one of two shutter speeds in response to detection of a headlamp and/or taillight of another vehicle. Accordingly, Applicants respectfully submit that Kobayashi et al. and Kise do not disclose, teach, suggest or render obvious the headlamp control system of the present invention, particularly as set forth in independent claim 72, as amended above, and the claims depending therefrom. Reconsideration and withdrawal of the rejection of claims 72-86 is respectfully requested.

Accordingly, Applicants respectfully submit that none of the cited references, either alone or in combination with any other cited references, disclose, teach, suggest or render obvious the headlamp control system of the present invention, particularly as set forth in independent claims 54 and 72, as amended above, and the claims depending therefrom.

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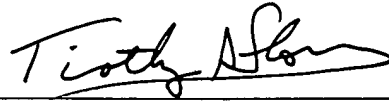
Claims 54-86 remain pending in the application. Claims 54, 57, 68, 70 and 72 have been amended above. In view of the above amendments and discussion, Applicants respectfully submit that all of the pending claims of the application are now in condition for allowance. Issuance of a Notice of Allowance is earnestly and respectfully requested.

Respectfully submitted,

KENNETH SCHOFIELD ET AL.

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Dated: July 16, 2002



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group : 2878
Examiner : E. Spears
Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
Serial No. : 09/992,441
Filing Date : November 16, 2001
For : VEHICLE HEADLIGHT CONTROL USING IMAGING SENSOR

Commissioner for Patents
Washington, D.C. 20231
Via Facsimile No. (703) 872-9318

Dear Sir:

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claims 54, 57, 68, 70 and 72 have been amended as follows:

54. (Amended) A headlamp control system for a motor vehicle comprising:

an imaging array sensor operable to sense light in a field of view forward of the motor vehicle; and

a control that is responsive to said imaging array sensor, said control being operable to identify at least one object of interest in the field of view by ~~at least one of a spectral signature of the at least one object and a~~ geometric organization of the at least one object, said control being operable to control a headlamp of the motor vehicle in response to an identification of said at least one object, said at least one object comprising at least one of a headlamp of at least one other vehicle approaching the motor vehicle, a taillight of at least one other vehicle being approached by the motor vehicle, a traffic sign, a lane marker and a traffic light.

57. (Amended) The headlamp control system of claim 54, wherein said control is operable to identify at least one object of interest in the field of view by ~~a geometric organization pattern recognition of the at least one object~~ two or more objects.

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68. (Amended) The headlamp control system of claim 66, wherein said control is operable to determine ~~a high~~ an activity condition in response to a threshold level of said level of objects of interest.

70. (Amended) The headlamp control system of claim 69, wherein said control is operable to adjust a headlamp of the motor vehicle between the low beam state and a high beam state in response to at least one of the ~~high~~ activity condition and the low beam duration of time.

72. (Amended) A headlamp control system for a motor vehicle comprising:

an imaging array sensor operable to sense light in a field of view forward of the motor vehicle, said imaging array sensor being ~~actuatable~~ operable to sense light for a first exposure period and a second exposure period, said first exposure period being greater than said second exposure period, said imaging array sensor being operable to sense light in at least one of said first and second exposure periods in response to a detection of light in the field of view forward of the motor vehicle which is indicative of at least one of (a) a headlamp of at least one other vehicle approaching the motor vehicle and (b) a taillight of at least one other vehicle being approached by the motor vehicle; and

a control that is responsive to said imaging array sensor, said control identifying at least one of a headlamp of at least one other vehicle approaching the motor vehicle and a taillight of at least one other vehicle being approached by the motor vehicle in response to light sensed during at least one of said first and second exposure periods.